

# Respiratory Hazards and Protection Requirements

## Module 1: Respiratory Hazards in Construction

Respiratory protection requirements are heavily enforced on government construction projects and as much as we groan at the thought of using respiratory protection, it really does keep us protected from gases, dust, mists, and fumes that could be present on our projects.

Most gas, dust, mist, and fumes are referred to as respiratory hazards.

Some respiratory hazards, like carbon monoxide can kill us in minutes. While others, like asbestos, can take years to make us sick. In fact, asbestos can cause lung cancer many, many years after a person breathes it in.

There are also lead dust hazards we need to be mindful of.

Lead dust and fumes come from grinding, welding, cutting, or brazing surfaces coated with lead-based paint. Can you imagine how many government construction projects require those activities?

One of the biggest problems with lead, is that it has no odor. Most people wouldn't have a clue that they've been exposed to it. Unfortunately, lead dust is so light, it floats around the project site landing in food, on water, and on clothes.

Silica dust is also a big concern on Government Construction projects. Crystalline silica is a common mineral found in construction materials such as sand, stone, concrete, brick, and mortar. Again, how many construction projects involve concrete, brick and mortar? The numbers are enormous.

When workers cut, grind, drill, or crush materials containing crystalline silica, very small dust particles are created. These tiny particles, known as "respirable" particles, can travel deep into a workers' lungs and cause silicosis, an incurable and sometimes deadly lung disease.

Exposure to respirable crystalline silica can happen during the most common construction tasks, such as using masonry saws, grinders, drills, jackhammers and handheld powered chipping tools.

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Heavy equipment operators such as those operating vehicle mounted drilling rigs, milling operators, operators of crushing machines, or using heavy equipment for demolition are also potentially exposed to Crystalline silica. In addition to the many government projects requiring blasting or tunneling.

About two million construction workers are exposed to respirable crystalline silica in over 600,000 workplaces.

Silica exposure is so widespread that OSHA, back in September of 2017, began enforcing new Testing requirements, which all government agencies require.

When there are respiratory hazards at your jobsite, your employer must use several methods to reduce your exposure to them, including:

- Engineering controls, such as local exhaust ventilation
- Work practice controls, such as wet-cutting techniques; and
- Administrative controls, such as minimizing the number of workers exposed to the hazard.

When employees can't be protected from respiratory hazards through controls, the employer must provide appropriate respiratory protection.

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## Module 2: Respiratory Program Administration & Requirements

The use of respirators is required when occupational exposure levels exceed the OSHA Permissible Exposure Limits or ACGIH Threshold Limit Values, or when engineering or administrative exposure controls are not feasible to implement.

We'll go over these values throughout this course and you'll also find them in the course materials which you can download from the main course page. If you didn't download the materials when you first started the course, you can go back to them any time as long as you are logged in and download them, or even re-download them.

Some workers want to wear respirators even when there are no particular hazards on the project, these are known as filtering face pieces or nuisance dust masks. Voluntary use of respirators, such as a nuisance dust mask is allowed.

Before a worker can use this type of respirator, it must be evaluated and approved by the respiratory program administrator, which is usually the Site Safety and Health Officer. This evaluation is to ensure that the use of the face mask, will in itself, not create a hazard.

After the face mask passes the SSHO's evaluation, the worker will be instructed in the limitations of the respirator and the correct method of wearing and using it.

### ***Respiratory Protection Program***

A written respiratory protection program must be developed and implemented when respirators are used. We've given you a template for a Respiratory Protection Program in your course materials.

This program is typically included in the project's Accident Prevention Plan which is submitted prior to the start of work. However, sometimes circumstances arise that weren't considered prior to being on the project or encountered until work began.

If this is the case, the Respiratory Protection Program will need to be developed and submitted for acceptance prior to workers wearing respiratory protection devices.

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All employees using respirators, with the exception of employees voluntarily using only filtering N.I.O.S.H. Approved dust masks, must be included in the respiratory protection program.

The program must also include the name and qualifications of a respiratory protection program administrator. This administrator must have the training, experience, and administrative authority to develop, implement and update the respiratory protection program if necessary. Again, this person is normally the Site Safety and Health Officer who should, of course, be taking this Titan University Respiratory Hazards and Protection Requirements Course.

The program administrator must ensure all respirator users comply with the requirements of the Respiratory Protection program.

And here are the qualification requirements for the Program Administrator:

- The program administrator must have documented knowledge and experience to understand OSHA's respiratory protection standard (29 CFR 1910.134)
- The administrator must be able to evaluate respiratory hazards at the project site and select appropriate respirators based on hazards or potential hazards
- The administrator must train employees on the use of respirators.

In order to be accepted, the written and enforced Respiratory Protection Program must include:

- The methods that will be used to identify and evaluate workplace respiratory hazards;
- The procedures used for selecting respirators for use;
- Any medical evaluations of employees required to use respirators;
- Fit testing procedures for tight-fitting respirators;
- Procedures for proper use of respirators in routine and reasonably foreseeable emergency situations;
- Procedures and schedules for cleaning, disinfecting, storing, inspecting, cartridge and

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canister change-out, repairing, discarding, and otherwise maintaining respirators;

- Procedures to ensure adequate air quality, quantity, and flow of breathing air for atmosphere-supplying respirators;
- Employee training regarding respiratory hazards which they are potentially exposed during both routine and emergency situations, and;
- Employee training in the proper use of respirators, including putting on and removing the respirator, any limitations on their use of the respirator, pre-use testing procedures, and respirator maintenance;

In relation to respirators, the terms donning and doffing are often used. Donning means to put the respirator on, while doffing means to take the respirator off.

Training must also include the procedures for regularly evaluating the effectiveness of the program; and the contents of 29 CFR 1910.134 Appendix D, *Information for Employees Using Respirators When Not Required under the Standard*. <https://www.osha.gov/laws-regs/regulations/standardnumber/1910/1910.134AppD>

Let's go back to the medical evaluation for a moment. Here are the requirements.

All employees, with the exception of employees voluntarily using filtering face pieces, must be medically evaluated to ensure they are fit enough to wear the selected respirators before being fit tested.

Completion of the respirator questionnaire from 29 CFR 1910.134, Appendix C, found in your course materials must be reviewed by a medical professional and a follow-up of the recommended medical exam and testing if required by the reviewing medical professional.

Medical clearances to wear respirators must include the telephone number, email address, and physical address of the medical facility or provider. The clearance paperwork must also include the printed name of the licensed and certified provider along with his or her signature. There needs to be a statement of clearances or limitations as well. And, just a reminder, never add personal medical information to this statement and do not include the full social security number.

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Finally, make sure the clearance includes the date of the exam and clearance expiration date.

## Using a Respirator Medical Evaluation Service

Many contractors choose to use an on-line, mail-in or in-person evaluation service for the purpose of clearing an employee to wear selected respirators. This is perfectly fine as long as the evaluation service is supervised by a Board-Certified or Board-Eligible Occupational Medicine Physician. The evaluation must be based upon the OSHA Respirator Medical Evaluation Questionnaire found in Appendix C 29 CFR 1910.134.

Additional medical evaluations must be provided when an employee reports or shows medical signs or symptoms related to the ability to use a respirator or a change occurs in workplace conditions.

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## Module 3: Respirator Selection

Respirator selection is done by the Respirator Program Administrator and based on objective industrial hygiene data for this or similar operations.

But, even before industrial hygiene data is considered, the RPA must use his or her knowledge of the current project hazards to determine the highest potential exposure.

The respirator cartridge or canister change-out schedule must also be taken into consideration when selecting a respirator. Using the manufacturers recommended change-out based on the operations or the objective industrial hygiene data or data from similar operations should always be considered prior to respirator selection.

Another thing to consider is the atmosphere where work will take place. If the atmosphere has less than 19% oxygen like some confined spaces do, an air purifying respirator can't be used. You can just cross it off your list.

Airline respirators, which are also known as supplied air respirators, or SAR, are used when air purifying respirators cannot provide sufficient protection from airborne concentrations of the chemical or chemicals being used.

Airline respirators are sometimes used when unknown chemicals are present or when known chemicals are known to be poorly absorbed into the chemical cartridges of the respirator.

The OSHA Respiratory Standard 29 CFR 1910.134 covers both air purifying and airline respirators. Determining the type of respirator to use is dependent upon a workplace assessment. Once the assessment is completed and engineering controls have been ruled out, the appropriate airline respirator can be selected.

Airline systems deliver air to a variety of face pieces; the type of face piece to be used depends on the situation and the best fit for the job at hand. There are tight fitting full-face and half-mask respirators, loose fitting hoods, helmets, and self-contained breathing apparatus (SCBA). Supplied air respirators operate in one of two modes: continuous flow (CF) or pressure demand (PD). Continuous flow gives the user a steady flow of air, while pressure demand releases air to the

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user only when the pressure differential is created as he or she breathes in.

If an airline respirator is used in an environment that has the potential to become IDLH, a respirator air attendant must be present to prevent the lines from becoming tangled or tied, to change the air supply tanks, and to confirm the air source is working properly. If the air supply is interrupted, the attendant must notify the respirator users to leave the area where the respirators are required.

## Fit Testing

Employees wearing respirators with tight-fitting face pieces like Supplied Air Respirators as well as Self-Contained Breathing Apparatus must be fit tested to ensure the selected respirators are indeed achieving a proper face-to-face piece seal. Fit testing shall be performed before initial use of the selected respirator, whenever respirator size, make or model is changed, and at least annually. Fit testing requirements must always comply with respiratory protection program requirements.



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## Module 4: Training & Recordkeeping

The RPA or his designee must provide respirator training at least annually, but earlier if the requirements change significantly due to process changes, changes in site specific operations, or a change of personnel.

Training annually is a requirement on Government Construction Projects and this is because annual training helps ensure the government that each employee using a respirator, can demonstrate knowledge of respirators use such as:

- Why is the respirator necessary and what are the hazards of an improperly fitted respirator?
- How to use the respirator and understanding that improperly maintained equipment can cause the protection of the respirator to fail.
- What are the limits and capabilities of a respirator?
- What's the best practice when using a respirator in emergency situations such as a respirator malfunction?
- How would the worker inspect, put on, check the seals, use, and remove the respirator?
- What are the maintenance and storage procedures for respirators?
- What are the general requirements of the OSHA respirator standard at 29 CFR 1910.134?

Believe me, every one of those training topics are necessary prior to using a respirator. And that's why learning each topic is mandatory.

## **Recordkeeping**

The contractor must establish and retain all written information regarding medical evaluations, fit testing, and the respirator program itself. This includes the Respiratory Protection Program, records of medical approval, fit test records, testing information and maintenance information.

By Standard Number / 1910.134 App C - OSHA Respirator Medical Evaluation Questionnaire (Mandatory).

**⚠ Alert:** Due to routine maintenance on the OSHA website, some pages may be temporarily unavailable.  
To report an emergency, file a complaint with OSHA or ask a safety and health question, call 1-800-321-6742 (OSHA).

- **Part Number:** 1910
- **Part Number Title:** Occupational Safety and Health Standards
- **Subpart:** 1910 Subpart I
- **Subpart Title:** Personal Protective Equipment
- **Standard Number:** 1910.134 App C
- **Title:** OSHA Respirator Medical Evaluation Questionnaire (Mandatory).
- **GPO Source:** e-CFR

### **Appendix C to Sec. 1910.134: OSHA Respirator Medical Evaluation Questionnaire (Mandatory)**

To the employer: Answers to questions in Section 1, and to question 9 in Section 2 of Part A, do not require a medical examination.

To the employee:

Your employer must allow you to answer this questionnaire during normal working hours, or at a time and place that is convenient to you. To maintain your confidentiality, your employer or supervisor must not look at or review your answers, and your employer must tell you how to deliver or send this questionnaire to the health care professional who will review it.

Part A. Section 1. (Mandatory) The following information must be provided by every employee who has been selected to use any type of respirator (please print).

1. Today's date: \_\_\_\_\_

2. Your name: \_\_\_\_\_

3. Your age (to nearest year): \_\_\_\_\_

4. Sex (circle one): Male/Female

5. Your height: \_\_\_\_\_ ft. \_\_\_\_\_ in.

6. Your weight: \_\_\_\_\_ lbs.

7. Your job title: \_\_\_\_\_

8. A phone number where you can be reached by the health care professional who reviews this questionnaire (include the Area Code): \_\_\_\_\_

9. The best time to phone you at this number: \_\_\_\_\_

10. Has your employer told you how to contact the health care professional who will review this questionnaire (circle one): Yes/No

11. Check the type of respirator you will use (you can check more than one category):

a. \_\_\_\_\_ N, R, or P disposable respirator (filter-mask, non-cartridge type only).

b. \_\_\_\_\_ Other type (for example, half- or full-facepiece type, powered-air purifying, supplied-air, self-contained breathing apparatus).

12. Have you worn a respirator (circle one): Yes/No

If "yes," what type(s): \_\_\_\_\_

\_\_\_\_\_

Part A. Section 2. (Mandatory) Questions 1 through 9 below must be answered by every employee who has been selected to use any type of respirator (please circle "yes" or "no").

1. Do you *currently* smoke tobacco, or have you smoked tobacco in the last month: Yes/No

2. Have you *ever had* any of the following conditions?

a. Seizures: Yes/No

b. Diabetes (sugar disease): Yes/No

c. Allergic reactions that interfere with your breathing: Yes/No

d. Claustrophobia (fear of closed-in places): Yes/No

e. Trouble smelling odors: Yes/No

3. Have you *ever had* any of the following pulmonary or lung problems?

a. Asbestosis: Yes/No

b. Asthma: Yes/No

c. Chronic bronchitis: Yes/No

d. Emphysema: Yes/No

e. Pneumonia: Yes/No

f. Tuberculosis: Yes/No

g. Silicosis: Yes/No

h. Pneumothorax (collapsed lung): Yes/No

i. Lung cancer: Yes/No

j. Broken ribs: Yes/No

k. Any chest injuries or surgeries: Yes/No

l. Any other lung problem that you've been told about: Yes/No

4. Do you *currently* have any of the following symptoms of pulmonary or lung illness?

a. Shortness of breath: Yes/No

b. Shortness of breath when walking fast on level ground or walking up a slight hill or incline: Yes/No

c. Shortness of breath when walking with other people at an ordinary pace on level ground: Yes/No

d. Have to stop for breath when walking at your own pace on level ground: Yes/No

e. Shortness of breath when washing or dressing yourself: Yes/No

f. Shortness of breath that interferes with your job: Yes/No

g. Coughing that produces phlegm (thick sputum): Yes/No

h. Coughing that wakes you early in the morning: Yes/No

i. Coughing that occurs mostly when you are lying down: Yes/No

j. Coughing up blood in the last month: Yes/No

k. Wheezing: Yes/No

l. Wheezing that interferes with your job: Yes/No

m. Chest pain when you breathe deeply: Yes/No

n. Any other symptoms that you think may be related to lung problems: Yes/No

5. Have you *ever had* any of the following cardiovascular or heart problems?

a. Heart attack: Yes/No

b. Stroke: Yes/No

c. Angina: Yes/No

d. Heart failure: Yes/No

e. Swelling in your legs or feet (not caused by walking): Yes/No

f. Heart arrhythmia (heart beating irregularly): Yes/No

g. High blood pressure: Yes/No

h. Any other heart problem that you've been told about: Yes/No

6. Have you *ever had* any of the following cardiovascular or heart symptoms?

a. Frequent pain or tightness in your chest: Yes/No

b. Pain or tightness in your chest during physical activity: Yes/No

c. Pain or tightness in your chest that interferes with your job: Yes/No

d. In the past two years, have you noticed your heart skipping or missing a beat: Yes/No

e. Heartburn or indigestion that is not related to eating: Yes/No

d. Any other symptoms that you think may be related to heart or circulation problems: Yes/No

7. Do you *currently* take medication for any of the following problems?

a. Breathing or lung problems: Yes/No

b. Heart trouble: Yes/No

c. Blood pressure: Yes/No

d. Seizures: Yes/No

8. If you've used a respirator, have you *ever had* any of the following problems? (If you've never used a respirator, check the following space and go to question 9:)

a. Eye irritation: Yes/No

b. Skin allergies or rashes: Yes/No

c. Anxiety: Yes/No

d. General weakness or fatigue: Yes/No

e. Any other problem that interferes with your use of a respirator: Yes/No

9. Would you like to talk to the health care professional who will review this questionnaire about your answers to this questionnaire: Yes/No

Questions 10 to 15 below must be answered by every employee who has been selected to use either a full-facepiece respirator or a self-contained breathing apparatus (SCBA). For employees who have been selected to use other types of respirators, answering these questions is voluntary.

10. Have you *ever lost* vision in either eye (temporarily or permanently): Yes/No

11. Do you *currently* have any of the following vision problems?

a. Wear contact lenses: Yes/No

b. Wear glasses: Yes/No

c. Color blind: Yes/No

d. Any other eye or vision problem: Yes/No

12. Have you *ever had* an injury to your ears, including a broken ear drum: Yes/No

13. Do you *currently* have any of the following hearing problems?

a. Difficulty hearing: Yes/No

b. Wear a hearing aid: Yes/No

c. Any other hearing or ear problem: Yes/No

14. Have you *ever had* a back injury: Yes/No

15. Do you *currently* have any of the following musculoskeletal problems?

a. Weakness in any of your arms, hands, legs, or feet: Yes/No

b. Back pain: Yes/No

c. Difficulty fully moving your arms and legs: Yes/No

d. Pain or stiffness when you lean forward or backward at the waist: Yes/No

e. Difficulty fully moving your head up or down: Yes/No

f. Difficulty fully moving your head side to side: Yes/No

g. Difficulty bending at your knees: Yes/No

h. Difficulty squatting to the ground: Yes/No

i. Climbing a flight of stairs or a ladder carrying more than 25 lbs: Yes/No

j. Any other muscle or skeletal problem that interferes with using a respirator: Yes/No

Part B Any of the following questions, and other questions not listed, may be added to the questionnaire at the discretion of the health care professional who will review the questionnaire.

1. In your present job, are you working at high altitudes (over 5,000 feet) or in a place that has lower than normal amounts of oxygen: Yes/No

If "yes," do you have feelings of dizziness, shortness of breath, pounding in your chest, or other symptoms when you're working under these conditions: Yes/No

2. At work or at home, have you ever been exposed to hazardous solvents, hazardous airborne chemicals (e.g., gases, fumes, or dust), or have you come into skin contact with hazardous chemicals: Yes/No

If "yes," name the chemicals if you know them: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

3. Have you ever worked with any of the materials, or under any of the conditions, listed below:

a. Asbestos: Yes/No

b. Silica (e.g., in sandblasting): Yes/No

c. Tungsten/cobalt (e.g., grinding or welding this material): Yes/No

d. Beryllium: Yes/No

e. Aluminum: Yes/No

f. Coal (for example, mining): Yes/No

g. Iron: Yes/No

h. Tin: Yes/No

i. Dusty environments: Yes/No

j. Any other hazardous exposures: Yes/No

If "yes," describe these exposures: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

4. List any second jobs or side businesses you have: \_\_\_\_\_

\_\_\_\_\_

5. List your previous occupations: \_\_\_\_\_

\_\_\_\_\_

6. List your current and previous hobbies: \_\_\_\_\_

\_\_\_\_\_

7. Have you been in the military services? Yes/No

If "yes," were you exposed to biological or chemical agents (either in training or combat): Yes/No

8. Have you ever worked on a HAZMAT team? Yes/No

9. Other than medications for breathing and lung problems, heart trouble, blood pressure, and seizures mentioned earlier in this questionnaire, are you taking any other medications for any reason (including over-the-counter medications): Yes/No

If "yes," name the medications if you know them: \_\_\_\_\_

10. Will you be using any of the following items with your respirator(s)?

a. HEPA Filters: Yes/No

b. Canisters (for example, gas masks): Yes/No

c. Cartridges: Yes/No

11. How often are you expected to use the respirator(s) (circle "yes" or "no" for all answers that apply to you)?:

a. Escape only (no rescue): Yes/No

b. Emergency rescue only: Yes/No

c. Less than 5 hours *per week*: Yes/No

d. Less than 2 hours *per day*: Yes/No

e. 2 to 4 hours per day: Yes/No

f. Over 4 hours per day: Yes/No

12. During the period you are using the respirator(s), is your work effort:

a. *Light* (less than 200 kcal per hour): Yes/No

If "yes," how long does this period last during the average shift: \_\_\_\_\_ hrs. \_\_\_\_\_ mins.

Examples of a light work effort are *sitting* while writing, typing, drafting, or performing light assembly work; or *standing* while operating a drill press (1-3 lbs.) or controlling machines.



b. *Moderate* (200 to 350 kcal per hour): Yes/No

If "yes," how long does this period last during the average shift: \_\_\_\_\_ hrs. \_\_\_\_\_ mins.

Examples of moderate work effort are *sitting* while nailing or filing; *driving* a truck or bus in urban traffic; *standing* while drilling, nailing, performing assembly work, or transferring a moderate load (about 35 lbs.) at trunk level; *walking* on a level surface about 2 mph or down a 5-degree grade about 3 mph; or *pushing* a wheelbarrow with a heavy load (about 100 lbs.) on a level surface. c. *Heavy* (above 350 kcal per hour): Yes/No

If "yes," how long does this period last during the average shift: \_\_\_\_\_ hrs. \_\_\_\_\_ mins.

Examples of heavy work are *lifting* a heavy load (about 50 lbs.) from the floor to your waist or shoulder; working on a loading dock; *shoveling*; *standing* while bricklaying or chipping castings; *walking* up an 8-degree grade about 2 mph; climbing stairs with a heavy load (about 50 lbs.).

13. Will you be wearing protective clothing and/or equipment (other than the respirator) when you're using your respirator: Yes/No

If "yes," describe this protective clothing and/or equipment: \_\_\_\_\_

14. Will you be working under hot conditions (temperature exceeding 77 deg. F): Yes/No

15. Will you be working under humid conditions: Yes/No

16. Describe the work you'll be doing while you're using your respirator(s):

\_\_\_\_\_  
\_\_\_\_\_

17. Describe any special or hazardous conditions you might encounter when you're using your respirator(s) (for example, confined spaces, life-threatening gases):

\_\_\_\_\_  
\_\_\_\_\_

18. Provide the following information, if you know it, for each toxic substance that you'll be exposed to when you're using your respirator(s):

Name of the first toxic substance: \_\_\_\_\_

Estimated maximum exposure level per shift: \_\_\_\_\_

Duration of exposure per shift: \_\_\_\_\_

Name of the second toxic substance: \_\_\_\_\_

Estimated maximum exposure level per shift: \_\_\_\_\_

Duration of exposure per shift: \_\_\_\_\_

Name of the third toxic substance: \_\_\_\_\_

Estimated maximum exposure level per shift: \_\_\_\_\_

Duration of exposure per shift: \_\_\_\_\_

The name of any other toxic substances that you'll be exposed to while using your respirator:

\_\_\_\_\_  
\_\_\_\_\_

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19. Describe any special responsibilities you'll have while using your respirator(s) that may affect the safety and well-being of others (for example, rescue, security):

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[63 FR 1152, Jan. 8, 1998; 63 FR 20098, April 23, 1998; 76 FR 33607, June 8, 2011; 77 FR 46949, Aug. 7, 2012]

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## UNITED STATES DEPARTMENT OF LABOR

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